

Appln. No. 09/668,938
Amdt. dated May 12, 2004
Reply to Final Office Action dated April 16, 2004

R E M A R K S / A R G U M E N T S

Reconsideration of the present application, as amended, is respectfully requested.

The April 16, 2004 Final Office Action and the Examiner's comments have been carefully considered. In response, claim 1 is amended to correct a minor typographical error, and remarks are set forth below in a sincere effort to point out patentable features of the present claimed invention. The amendments are supported by the application as originally filed. Therefore, no new matter is added.

Inasmuch as the present Amendment raises no new issues for consideration, and, in any event, places the present application in condition for allowance or in better condition for consideration on appeal, its entry under the provisions of 37 CFR 1.116 is respectfully requested.

ALLOWABLE SUBJECT MATTER

The Examiner's indication that claims 18, 20 and 21 contain allowable subject matter is acknowledged and appreciated.

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PRIOR ART REJECTIONS

In the Office Action, claims 1, 2, 4, 5, 7 and 22-28 are rejected under 35 USC 103(a) as being unpatentable over USP 3,952,201 (Hounsfield) in view of USP 5,482,042 (Fujita). Claims 6 and 8 are rejected under 35 USC 103(a) as being unpatentable over Hounsfield in view of Fujita and further in view of USP 4,547,892 (Richey et al.). Claim 9 is rejected under 35 USC 103(a) as being unpatentable over Hounsfield in view of Fujita and Richey et al. and further in view of USP 4,751,644 (Koka et al.). Claim 10 is rejected under 35 USC 103(a) as being unpatentable over Hounsfield in view of Fujita and Richey et al. and further in view of USP 4,878,499 (Suzuki et al.).

The Examiner's rejections are respectfully traversed on the grounds that the cited prior art does not disclose, teach or suggest controlling movement of an X-ray device by "controlling a start of each of the X-ray cycles based on the motion signal" with the effect that each X-ray cycle commences at a different instant in the different phases of motion of the organ as set forth in independent claim 1 (emphasis added).

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This feature is a positive step which implies a link, connection or dependency between the start of the X-ray cycles and the motion signal. Specifically, to determine when to start an X-ray cycle, the motion signal is monitored to determine a starting instant for each X-ray cycle (relative to the motion signal) which differs from the starting instant of previous X-ray cycle(s). For example, once the first X-ray cycle is complete and the X-ray device is returned from the final X-ray position to the initial X-ray position, it is held in the initial X-ray position until a different instant in the motion phase, e.g., at the beginning of the high-motion phase when the initial X-ray cycle started at the beginning of the low-motion phase (see the specification at page 6, lines 11-25 with reference to Fig. 4).

Accordingly, in the invention the start of the X-ray cycle is based on the motion signal, i.e., the motion signal is considered when determining the start of the X-ray cycle.

Hounsfield describes an X-ray device having a scanner including an X-ray source 4 and X-ray detector 6 mounted on an annular turntable member 7 which rotates around a body 1 being examined. Irradiation of the body 1 occurs via operation of the X-ray source 4 when the amplitude of the motion of the body 1 is

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below a threshold (see Figs. 2(a)-2(c)). Since the scanner does not obtain X-ray images from angular positions in which it is not operating during a first revolution of the member 7 about the body 1 (e.g., angular positions α - β in Fig. 2(c)), in a second revolution, the speed of a motor 8 which controls rotation of the member 7 is adjusted so that the X-ray source 4 is active between angular positions α - β .

The Examiner referred to Figs. 2(a) and 2(c) to show the claimed feature of controlling the start of the X-ray cycles based on the motion signal. Although Figs. 2(a) and 2(c) appear to show that the second revolution starts at a different instant during the motion signal than the first revolution, this is an incidental result and does not imply intentionally basing the start of each X-ray cycle on the motion signal or considering the motion signal when determining the start of each X-ray cycle.

Indeed, in contrast to the invention, in Hounsfield, there is no express or implied consideration of the motion signal when determining the start of each X-ray cycle, i.e., the start of the X-ray cycles is in no way based on the motion signal. Rather, the X-ray cycles appear to continuously start upon rotation of the turntable member 7, i.e., once the turntable member 7 starts

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rotation, it continues its rotation with only its speed of rotation being variable. This is clear from Fig. 2(c) wherein the second revolution starts immediately after the first revolution is complete, and the third revolution starts immediately after the second revolution is complete, without regard to whether the motion signal is at a different phase. Thus, the start of the X-ray cycles is not based on the motion signal.

Fujita also does not disclose, teach or suggest controlling the start of multiple X-ray cycles based on a motion signal at a different instant in the different phases of motion of the organ.

In view of the foregoing, claim 1 is patentable over Hounsfield and Fujita when taken either alone under 35 USC §102 or in combination under 35 USC §103(a).

The other references of record do not close the gap between the present claimed invention as defined by claim 1 and Hounsfield in view of Fujita.

Therefore, claim 1 and claims 2, 4-10 and 22-28 which are dependent thereon are patentable over all of the references of record under 35 USC §102 as well as 35 USC §103.

Even further, the cited prior art does not disclose all of the features of the dependent claims. For example, with respect

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to claims 22 and 23, the Examiner considers the segment from 0° - β° in Hounsfield to be a semi-circular arc on which the X-ray positions are arranged. However, in Hounsfield, the X-ray positions are defined over the entire circular arc from 0° - 360° , and in fact the X-ray device is operative in the first revolution over the segment from β° - 360° . Thus, Hounsfield does not disclose, teach or suggest defining an X-ray cycle in which X-ray positions along only a semi-circular arc are successively occupied.

With respect to claims 25-27, the Examiner considers the X-ray position at 0° in Hounsfield to be an initial position and the X-ray position at β° to be a final position. However, the X-ray position at β° is not a final position since the X-ray device continues its rotation to provide a complete 360° revolution about the body. Thus, the initial position and the final position are one and the same. Therefore, there cannot be any movement of the X-ray device from the final position to the initial position between successive X-ray cycles (as set forth in claims 25 and 26) and the initial and final positions cannot be opposite one another on a semi-circular arc (as set forth in claim 27).

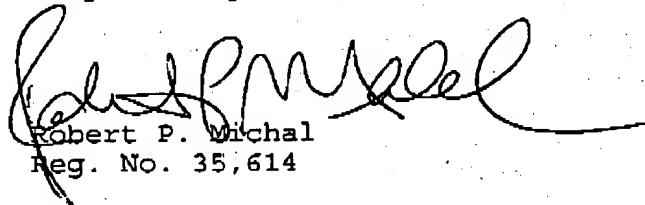
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If the Examiner disagrees with any of the foregoing, the Examiner is respectfully requested to point out where there is support for a contrary view.

Entry of this Amendment under the provisions of 37 CFR 1.116, allowance of the claims, and the passing of the application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,


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